LEAD POISONING IN ILLINOIS

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The Illinois Commission on Occupational Diseases which began work last March has devoted the nine months of its existence to a study of the poisonous trades in which the workers are exposed to the effects of lead, arsenic, brass, zinc, carbon monoxide, turpentine and its substitutes, acetone, amyl acetate, wood alcohol, etc.; naphtha, cyanide of potash, nitrate of silver, chromate of potash, hydrofluoric acid. We chose the poisonous trades because of their importance and because of the clear connection which can be made between trades and diseases, far clearer than in the dusty trades, or those with heat, cold, or humidity, or those in which there is excessive fatigue. None of these last trades has been touched upon.

The investigation into the lead trades in Illinois made by the Commission on Occupational Diseases has covered 28 trades in which lead poisoning may occur. Cases of lead poisoning have been found in all these trades. Five hundred and sixty-eight individual cases have been discovered from the records of the past three years and information has been gathered from foremen in the establishments visited and from physicians which points to a much larger figure than that. Six factories alone are said to yield yearly no less than 380 cases. These figures could not be included in our list of individual cases, although we realize that they represent much more nearly the actual numbers. It is necessarily only a small fraction of the victims of lead poisoning whose names and addresses can be procured, for the majority of physicians keep no records of their patients. Some do not even attempt to keep the names if these are foreign and hard to catch.

The number of cases in the year 1910 is very much larger than the number for either of the two preceding years, 304 out of 568, but this is not to be interpreted as an increase of lead poisoning during 1910. It is explained by the fact that the recent cases were much easier to discover than former cases. Men presented themselves for examination who were at the time suffering from lead poisoning, and in the investigation of shops such cases could also be detected, but a past history of lead poisoning was much harder to obtain. Many men who become leaded, especially if they are unskilled workmen, give up the trade at once, following

a doctor's advice, and these cases are seldom heard from afterwards. There are very few women on our list, only 18 out of a total of 568, and the fact that the lead trades in this state employ very small numbers of women is a great advantage, for women are notoriously more susceptible to this form of poisoning than men are.

It would be too long a list if I should undertake to tell you all the trades in which we discovered that lead poisoning might and does occur, but you may be interested in hearing of a few of the more unusual ones. We found individuals suffering from lead poisoning contracted in the following occupations: making wall paper, rolling and unrolling wall paper, finishing handles for coffins, polishing cut glass, repairing storage batteries, wrapping cigars in tin-foil, working in brass foundries, enameling bath tubs, laying electric cables underground. Two men poisoned themselves by holding lead covered nails in their mouths while shingling roofs.

In looking over our records of cases certain industries stand out as especially dangerous, productive of much lead poisoning. These are the white lead industry, lead smelting and refining, the making of storage batteries, of dry colors and paints, and the painting trade. Out of the 304 cases of lead poisoning known to have occurred during 1910, all but 62 belonged to these five trades. We studied carefully the methods of work in these industries and the condition under which the work is done, and came to the conclusion that all these trades must be considered inherently dangerous as carried on in this country, but that all could be made far safer than they are without any radical change in method. That is, there are processes in use in America which are in themselves dangerous and expose the workmen to lead poisoning, and these dangers could be eliminated only by a change in method. But on the other hand there are quite unnecessary dangers, due not to the method used, but only to carelessness, to lack of thought.

The lead smelting industry is a case in point. As carried on in America it is a far more dangerous trade than in Europe, and nothing but a change of method could make any of our plants as safe as a German lead smelting works. Unfortunately, however, the American lead smelter—he is usually a newly arrived Slav, Greek, or Italian—is not only exposed to risks which he would escape in Germany, but he is not nearly as well cared for as he would be there. Our methods compel a man to work in an atmos-

phere of lead dust and fumes which foreign methods have done away with, and our workmen are often completely neglected, while the foreign workman is cared for under a doctor's supervision.

We have evidence that there is much lead poisoning among the lead smelters in Illinois; 181 cases have been found to have occurred during the last three years, and, from the statements of physicians, managers, and foremen, it is evident that many cases remain undiscovered because the unskilled foreigners leave the work as soon as they begin to suffer from the effects of the poisoning, and are, consequently, never heard of. Thirty-one physicians practicing among lead smelters have told us that they consider this a very dangerous trade, and that probably all of the men engaged in the dustiest parts or where the fumes are greatest become leaded after a few months. Eleven physicians have stated that they see a total of 270 cases a year among the workers in the three largest smelting plants. Some of these undoubtedly are duplicate cases, but there are many other physicians practicing among these people who were not interviewed. It would be better if the dangerous processes could be given up altogether, but without demanding anything so radical we could still insist on improvements which would make them far safer. The six lead smelting works united have a pay roll of about 1190 men, all but 145 of them being employed by the three largest plants. But according to the most conservative statements of the foremen there are at least 4000 men employed in these three works in the course of the year, owing to the continually changing working force.

The making of storage batteries as done in our state is much more dangerous than the same trade in England. Illinois has no large storage battery works, but many small places which either make or assemble or repair storage battery plates. This trade is everywhere recognized as dangerous, and it is not possible to make a storage battery factory entirely safe, although the evils could be greatly reduced in the eleven places which we visited, by the adoption of methods which have been thoroughly tested and found successful. None of the factories visited was found to be using all possible precautions to protect the men; some of them were very bad, especially smaller places, doing repairs. Some of the most rapidly developing and severe cases of lead poisoning on our list have been contracted in making storage batteries, and what adds to the danger to the workmen is that

they are usually ignorant of the fact that they are handling poisonous lead compounds. One newly arrived Russian Jew was set to working with the red lead paste and used to moisten his fingers in his mouth as he worked because he had never been told that the stuff was dangerous. He was seriously leaded at the end of ten days.

A striking contrast can be made between this trade here and in England. At the Hart Accumulator Works in London, employing over 100 men, not one case of lead poisoning occurred last year. One small plant in Chicago, where old batteries are recharged and repaired, sent two cases to hospitals in nine months' time, although it employs only fifteen men.

The white lead industry in Illinois has improved more than any other lead trade during recent times. Three of our four factories are new and very well constructed, and in all but one of the four there is a strong effort being made to do away with some of the more dangerous features and to make the work as safe as possible under American conditions. The managers are also beginning to see the necessity of personal supervision of their men, and we bid fair to have soon in our Illinois plants a system of hygienic control very nearly approaching that which is in force now in England, including regular medical inspection of the men, only here it will have been voluntarily adopted by the managers of all but one factory.

That the methods used over here are far more dangerous than those used in Europe and England, and that our men have suffered from lack of this personal supervision, can be shown by statistics. The four factories together employ about 420 men. We have found 155 individual cases which have developed in these places during the last three years. Thirteen physicians say that they have had 187 cases a year. Undoubtedly some of these cases are duplicated but undoubtedly also many leaded men visit physicians whom we did not interview.

Here are a few comparative figures: Cookson White Lead Works in Newcastle on Tyne, a model English factory, employs 182 men. Careful individual medical inspection of the men failed to show one case last year. A model Illinois factory employs through the year about 200 men. Medical examination of the men who complained or seemed ill revealed 25 cases of poisoning last year. Locke-Lancaster's White Lead Works in London employs 92 men. They did not have a case of lead poisoning

for five successive years. In an Illinois factory, with a slightly larger pay roll, 28 per cent of all the employees have been leaded.

As I said a moment ago, there are great improvements now in course of introduction in the white lead industry, and their effect will certainly be shown during the coming year by a fall in the number of lead poisoned workmen. Nevertheless, as long as American methods of manufacture remain what they are, there will be dangerous processes in this trade and the need of great vigilance to prevent poisoning.

Our paint and dry color houses, where dry lead colors are produced and handled, have also an unnecessarily large amount of lead poisoning; and this is not due to difference in method but solely to neglect, as is shown by the contrast between two of them. I have two factories in mind, both new, well constructed, admirable externally. They employ about an equal number of men. We have not, during the nine months of our inquiry, traced a single case of lead poisoning to the first of these. We have found eleven cases which belong to the second. This is an illustration of the results of leaving all such matters to the good will of the employer, for I can find no other cause for this difference except the care given the men in one place and the neglect in the other.

The painting trade is another in which American methods are far more dangerous than those in use in England, France, Germany, and the Low Countries. Numerically it is our most important lead trade. There are 20,000 union painters in Illinois, and the union officials estimate about half as many non-union men. Thirty per cent of all the individual cases of lead poisoning for 1910 are painters, but as most of these came from the union books we feel sure they represent only a small fraction of the real numbers. The most dangerous part of the work is done largely by non-union painters, many of them unskilled and ignorant of the dangers of the work. The painter acquires lead poisoning not through the skin, as is commonly believed, but through eating lead-smeared food or chewing lead-smeared tobacco, or breathing dry lead dust. The first evil he can avoid by a careful washing before eating, provided there is any place for him to wash. House and sign painters often have the choice between a lunch eaten with paint smeared hands and no lunch at all.

The second danger to which the painter is exposed is the dust-laden atmosphere caused by mixing dry white or yellow lead with paint or putty, which work is done by very few painters,

and by sandpapering coats of lead paint after they are dried. This last is recognized by all skilled painters as the most dangerous work the painter has to do, against which he cannot protect himself; so that, although the painters themselves may be held responsible for the lead poisoning which comes from handling food and tobacco with unwashed hands, they cannot be held responsible for the far larger number of cases which result from this dry rubbing-down process, carried on, as it usually is, inside closed rooms with no system of ventilation to remove the dust. Very rapid and severe forms of lead poisoning occur as a result of this work. Three cases were recently found in one railway shop, all of which had developed after only four weeks' work. One was a newly arrived Italian; he was not a painter by trade, and when he was put to sandpapering the ceilings of sleeping cars, he had no idea of the dangers of the work. This sort of work, done in factories, employs large numbers of non-union painters. It is often said that painters cannot be protected unless we abolish the use of white lead paint, as they are doing in France. At the International Congress in Brussels this year, I heard that question discussed, and the English and German hygienists were against so radical a measure as that, holding rather that white lead paints should be used for exterior work but be forbidden in interior work, where zinc white serves just as well. But even with the use of white lead paint, it is still possible to protect the painter better than we do now. In Germany the contractor is obliged to provide a warm room in which his painters may wash, change their clothes, and eat lunch—this, even if the work done is in the country or on the edge of the city. In Germany and Belgium no lead paint may be rubbed or sandpapered while dry. Water must be used. In England this method is said to be universally employed, even on the finest carriages and automobiles. I do not know why it is considered impossible in these industries in America.

Leaving the dangerous lead trades, we find a number of trades in which lead is used which should not be productive of lead poisoning, which might be practically safe, but which, in Illinois, do yield a certain number of victims. These are the trades, very important as far as numbers go, in which metallic lead is melted and cast, rolled, drawn out into tubes, cables, wires, etc. The printing trade is included here, the metal and junk shops, the plumbers' trade, the brass foundries, where some lead is always

used, the making of "novelties", of car-seals, coffin handles and ornaments, tin-foil, and a number of objects which have more or less metallic lead about them.

The dangers in this sort of work are easy to avoid, for they consist in fumes from the melting pot which can be carried off by proper suction fans, and dust from old lead or dross which can be eliminated by simple cleanliness. The 54 cases of lead poisoning which we found in these trades were probably all entirely avoidable. The printing trade is a striking example of a lead trade which is notoriously unhealthful and needlessly so. It is carried on usually under wretched sanitary conditions, with insufficient provisions for carrying off fumes and accumulation of lead dust on floors, walls, and machinery. The impression gained by our investigators was that the conditions in a printing establishment depended solely upon the will of the manager, for sometimes the best conditions were found in small, inexpensive places, and some of the worst were in large newspaper houses. It would be a comparatively simple thing to make the printing trade as safe as most other indoor occupations, for it requires only provision for protecting the workman against fumes and dust, and providing him with facilities for washing before he leaves work. As it is, the printers apparently suffer a great deal from chronic lead poisoning. Only 31, possibly 35, cases of the acute form were found in 1910 in Chicago, but the death records of the union show that there is an abnormally high death rate from diseases which may come from the changes brought about by the slow absorption of lead, such as apoplexy, heart disease, and kidney diseases.

We were agreeably disappointed in our study of certain industries usually regarded as more or less dangerous lead trades, such as the plumbers' trade and the making of plumbers' supplies, rubber, glass, pottery, enamels, and tinware for kitchen utensils. In Illinois these are not dangerous lead trades. According to the most authoritative evidence we could obtain, lead is not used in this state in the making of glass, while most of the glaze for pottery, bricks, and tiles, the enamel for signs, and the enamel for kitchen utensils, are all free from lead. Cheap kitchen tinware is said to consist of sheet iron or steel with an exceedingly thin coat of pure tin. Sulphate of lead is used for rubber, instead of white lead. The plumbers' trade is changing from a lead to an iron and brass trade. This is true of the plumbers' trade

everywhere, but the other industries are very important lead trades in some states and expose many workmen to the dangers of lead poisoning. Indeed Illinois is not nearly so important a lead state as some of the eastern states with their manufactures, or some of the western states with their lead smelting.

It is gratifying to note that the evils in the lead trades tend to grow less instead of greater, because machinery is everywhere being introduced and displacing hand work. As the demand for lead increases, there is more care taken against waste, which means that in well managed establishments the fumes from smelting and refining lead are collected, as well as the dust from grinding and sifting. All this tends to diminish the danger of the workmen. There is practically unanimous testimony from the employees in the lead trades as to this steady improvement in conditions.

Unfortunately, the advance of methods of work has not been paralleled by an improvement in the care of the men. This is very imperfect in all the lead trades and in some there are apparently no measures taken to protect the men against poisoning. It is in consequence, perhaps, of this very general indifference to the welfare of the employees that we find the dangerous lead trades in bad repute with the working class; and, as the employers themselves declare, only the most ignorant and helpless foreigners seek employment in these industries. There are exceptions in the case of certain well paid, skilled departments, but for the most part the lead workers are poorly paid, non-English-speaking foreigners or negroes, who tend to drift in and out of these factories. We found one place, for instance, where 50 men are employed yearly, though the number needed is only 13. Another place must employ 300 men a year, in order to keep up a force of 50. Still another with a pay roll of between 450 and 600 loses from 20 to 40 per cent of its working force every pay day. As it is only with a steady force of workmen that any real shop discipline can be maintained, with men trained to protect themselves against the dangers of the trade, it follows that this shifting of men from place to place is productive of much more poisoning than would occur in a permanent force of men. There are indications that some of the larger establishments, notably the white lead works, are beginning to recognize the economic waste of this form of labor, and several are planning reforms which will result in protection for the men against lead poisoning.